REMARKS/ARGUMENT

The claims in this Application remain rejected under 35 U.S.C. 103 over Asaba in view of Abu-Shumays. Reconsideration and withdrawal of the rejection is respectfully requested.

The apparatus claims now pending call for a flow cell and goniospectrophotometer in combination with an interference effect pigment reactor. The method claims call for an interference effect pigment sample. These are important features in the present invention for which there is no factual basis in either of the references applied nor is there any motivation into adapt what is disclosed in those references to realize such features.

Asaba teaches the use of a goniospectrophotometer to quantify color. Abu-Shumays teaches the use of a flow cell packed with an absorbent to permit fluorescence to be measured. Neither of these references has any relationship to an interference effect pigment.

There are significant differences between interference effect pigments and color generation materials or pigments in general. These effect pigments are constituted by a plurality of platelet substrates, each of which have individually been coated with a metal oxide layer or layers. Color is generated as a result of multiple reflections and refractions of light as the light passes through the various interfaces between the layers which constitute the pigment. The apparent color which is generated is a function of the optical thickness of the coating. The optical thickness is a function of the refractive index of the coating and its physical thickness while the physical thickness is a function of the coating process parameters and conditions.

These interference pigments are made by forming a hydrous coating on the

platy substrate, followed by calcining. The thickness of the hydrous layers changes during calcining in an amount which is dependent on the calcining time and calcining temperature. The resulting change in the physical thickness of the coating changes the optical thickness which, in turn, changes the apparent color. Control of the final product characteristics during manufacture is further complicated by the fact that the color changes rapidly as a result of reaction rates and even further, because free particles of the coating which unattached to the platy substrate can form and effect the apparent color.

In addition, the platy particles being coated may or may not be oriented during the manufacturing process. However, the compositions in which the pigments are incorporated are generally processed so that the individual particles become similarly oriented in order to achieve the maximum desired appearance. Therefore, the appearance of an in-process material may not reflect the color achieved in actual use.

As a result of all of the foregoing, it will be appreciated that the visual appearance of an in-process material during manufacture can be misleading.

Because of all the foregoing considerations, a simple viewing or measuring of the in-process material is not particularly reliable. In order to inaccurately monitor color, it would be necessary to obtain and dry a sample of the in-process pigment, suspend it in a coating carrier and coat a color evaluation substrate before evaluating color. This is clearly both impractical and time consuming. As a practical compromise, therefore, what has been done is the operators rely on a simple subjective visual observation of the pigment dispersion of the coatings as it is being formed on the platy substrates while trying to maintain the process conditions as close as possible to predetermine parameters. This, of course, requires reliance on experienced operators.

The present invention was based on the recognition that the assessment of

color of an in-process sample of this particular material, namely an interference effect pigment, could be achieved with a reasonable degree of reliability provided that the evaluation was made in a flow cell which was configured to provide a macroscopic alignment of the effect pigment particles. By using such a flow cell, the alignment of the effect pigment particles is such that an oriented platelet collection is presented to the spectrophotometer light beam, improving the amount of reflected light. This, in turn, provides a means to preferentially measure the reflection color over the absorption color. The Asaba reference does not teach or suggest a flow cell, as the Office Action acknowledges. The Abu-Shumays reference teaches a flow cell but does not teach or suggest an interference effect pigment and the flow cell of this reference would have a random orientation of the coated materials in its flow stream. Use of a traditional flow cell for the purposes of the present application will result in a failure to achieve the desired measurement even with the use of the arrangement described by Abu-Shumays due to the random orientation of the in-process pigment platelets in the flow stream. The flow cell would have to be reconfigured to provide the desired orientation but there is no teaching or suggestion in the references of so doing it nor is there any motivation

In light of these considerations, withdrawal of the rejection and allowance of this application is respectfully solicited.

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Respectfully submitted,

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